

CLAIMS

What is claimed is:

5 1. A method for estimating a BIS artifact for a detector element, the method comprising:

acquiring a first incident X-ray spectrum attenuated by water and a second incident X-ray spectrum attenuated by bone and water at a detector element; and

10 scaling the first incident spectrum to produce a scaled spectrum which corresponds to the second incident spectrum, wherein the scaled spectrum differs from the first incident spectrum at a projection value by an apparent projection value shift which corresponds to a BIS artifact at the projection value for the detector element.

15 2. The method as recited in claim 1, further comprising:

generating a BIS correction factor based upon the BIS artifact at the projection value; and

reconstructing an image using the BIS correction factor.

20 3. The method as recited in claim 2, further comprising:

combining the BIS correction factor with one or more other correction factors.

25 4. The method as recited in claim 2, further comprising displaying the image.

5. The method as recited in claim 1, wherein the first incident X-ray spectrum is a calibration spectrum.

30 6. The method as recited in claim 1, wherein the first incident X-ray spectrum reflects the X-ray attenuation through varying path lengths of water.

7. The method as recited in claim 1, wherein the second incident X-ray spectrum reflects the X-ray attenuation through varying path lengths of bone and water.

8. The method as recited in claim 1, further comprising:

5 determining the BIS artifact for each of one or more additional detector elements; and

generating a matrix the of BIS correction factors associated with the respective detector elements.

10 9. The method as recited in claim 8, further comprising reconstructing an image using the matrix of BIS correction factors.

10. The method as recited in claim 9, further comprising displaying the image.

15 11. A CT image analysis system comprising:

an X-ray source configured to emit a stream of radiation;

a detector configured to detect the stream of radiation and to generate one or more signals responsive to the stream of radiation, wherein the detector comprises a plurality of detector elements;

20 a system controller configured to control the X-ray source and to acquire projection data from one or more of the detector elements via a data acquisition system, wherein the projection data comprises a first incident X-ray spectrum attenuated by water and a second incident X-ray spectrum attenuated by bone and water at the one or more detector elements; and

25 a computer system configured to scale the first incident spectrum to produce a scaled spectrum which corresponds to the second incident spectrum and differs from the first incident spectrum by an apparent projection value shift corresponding to a BIS artifact for the one or more detector elements.

12. The CT image analysis system as recited in claim 11, wherein the computer system is further configured to generate a BIS correction factor for each detector element based upon the BIS artifact and to reconstruct an image using the BIS correction factors.

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13. The CT image analysis system as recited in claim 12, further comprising an operator workstation configured to display the reconstructed image.

14. A CT image analysis system comprising:
10 an X-ray source configured to emit a stream of radiation;
a detector configured to detect the stream of radiation and to generate one or more signals responsive to the stream of radiation, wherein the detector comprises a plurality of detector elements;
15 a system controller configured to control the X-ray source and to acquire projection data from one or more of the detector elements via a data acquisition system;
a computer system configured to receive the projection data and to reconstruct the projection data to form an image;
an operator workstation configured to display the image; and
means for estimating a BIS artifact using spectral matching.

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15. The CT image analysis system as recited in claim 14, further comprising means for correcting the BIS artifact in the image.

16. A computer program, provided on one or more computer readable media, for estimating a BIS artifact for one or more detector elements, comprising:
25 a routine for acquiring a first incident X-ray spectrum attenuated by water for each of one or more detector elements;
a routine for acquiring a second incident X-ray spectrum attenuated by bone and water at each of the one or more detector elements; and
30 a routine for scaling the first incident spectrum to produce a scaled spectrum which corresponds to the second incident spectrum, wherein the scaled spectrum differs

from the first incident spectrum by an apparent projection value shift which corresponds to a BIS artifact at the projection value for the respective detector element.

17. The computer program as recited in claim 16, further comprising:

5 a routine for generating a BIS correction factor for each detector elements based upon the BIS artifact at the projection value; and

a routine for reconstructing an image using the BIS correction factors.

18. The computer program as recited in claim 17, further comprising a

10 routine for combining the BIS correction factors with one or more other correction factors for each detector element.

19. The computer program as recited in claim 17, further comprising a

routine for displaying the image.

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20. The computer program as recited in claim 16, wherein the first incident X-ray spectrum is a calibration spectrum.

21. The computer program as recited in claim 16, wherein the second

20 incident X-ray spectrum reflects the X-ray attenuation through varying path lengths of bone and water.